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Essex Agricultural Society.

REPORT

ON

Field Experiments,

1893-1894.

BY

BERNARD DYER, D.Sc., F.C.S., F.L.S.,

Consulting Chemist to the Society,

Of 17, Great Tower Street, London,

AND

EDWARD ROSLING, F.R.M.S.,

Of Melbourne, Chelmsford.

Colchester:

PRINTED AT THE ESSEX COUNTY STANDARD OFFICE.

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ESSEX AGRICULTURAL SOCIETY.

Report on Field Experiments

1893-1894,

BY

BERNARD DYER, D.Sc., F.C.S., F.L.S., Consulting Chemist to the Society, of 17, Great Tower Street, London;

AND

EDWARD ROSLING, F.R.M.S., of Melbourne, Chelmsford.

A NUMBER of Field Experiments were projected for 1893, including continued trials in the Manuring of cabbages and of Potatoes on Mr. Rosling's Farm at Melbourne; experiments on the Manuring of Sainfoin on the farm of Mr. Reginald Christy, of Roxwell; and Barley experiments at the farm of Mr. S. W. Squier, of Stanford-le-Hope, and also at the farm of the Salvation Army, under the management of Major Stitt, at Hadleigh. Mr. Champion Russell was also good enough to start a series of small Grass Plots, destined to serve hereafter for demonstration purposes, illustrative of the results of continued manuring in various ways.

This somewhat extended programme of operations was undertaken with the co-operation of the Technical Instruction Committee of the Essex County Council, and might have been expected to result in an interesting crop of information had not the well-remembered drought, which rendered the season of 1893 so very abnormal, proved disastrous to the experiments in nearly all cases.

The Sainfoin Experiments were of no value whatever, and in the case of the projected Barley Experiments at Stanford-le-Hope and Hadleigh also the scheme of experiments proved abortive. Any results that might have been obtained from the Cabbage plots at Melbourne were so obviously unreliable that it was useless to weigh the crop. The Potato crop, however, was weighed, and the results were recorded for what they might be worth.

It was not, however, thought worth while to issue a special report for 1893.

In the following year, discouraged perhaps by the unfortunate breakdown of the promising programme for 1893, and in view of the expense then fruitlessly incurred, the County Council did not consider itself in a position to renew its experimental partnership with our Society, and a still more extended programme of work, which had been provisionally suggested to be carried out in 1894, with the assistance of Mr. Dymond and Mr. Houston, the scientific officers of the Technical Instruction Committee, was obliged to be cut down to the more modest dimensions that will be gathered from the present report.

The actual experiments which we now record are as follows:—

1893.

POTATOES.—At Melbourne, Chelmsford.

1894.

POTATOES. — (Manuring Experiments) at Melbourne, Chelmsford.

CABBAGES. — (Manuring Experiments) at Melbourne, Chelmsford.

WHEAT.—(Variety Experiments) at Melbourne, Chelmsford.

WHEAT.—(Variety Experiments) at Little Boyton Hall, Roxwell.

OATS—(Variety Experiments) at Melbourne, Chelmsford.

BARLEY—(Manuring Experiments) at Little Boyton Hall, Roxwell.

POTATOES (at Melbourne, Chelmsford) (Mr. Rosling).

As the scheme of Manuring in the years 1892, 1893, and 1894 was the same, it appears convenient to re-state the 1892 results with those of 1893 and 1894, and we have therefore done so in the following table. We have also added a column, showing the average or mean results of the years 1892 and 1894, leaving out of account 1893, as the produce of an altogether anomalous season. To the table showing the total yields under the different systems of Manuring is added another table in which, for each plot, the yield of the wholly unmanured land is deducted, showing, therefore, the excess of crop obtained on each manured plot in virtue of the manure used.

Manure per Acre.	1892. Potatoes.			1893. Potatoes.			1894. Potatoes.			Average of 1892 & 1894. Potatoes.		
	T.	C.	Q.	T.	C.	Q.	T.	C.	Q.	T.	C.	Q.
No Manure	7	5	2	8	8	3	4	19	0	6	2	1
Ditto	7	3	0	8	3	1	5	5	2	6	4	1
Mean of these Plots	7	4	1	8	6	0	5	2	1	6	3	1
Dung 7 tons	10	9	2	9	12	0	6	1	0	8	5	1
Dung 7 tons, Super 4 cwt., Nitrate of Soda 2 cwt.	11	13	0	9	1	1	7	7	3	9	10	2

Manure per Acre.	1892. Potatoes.			1893. Potatoes.			1894. Potatoes.			Average of 1892 & 1894. Potatoes.		
	T.	C.	Q.	T.	C.	Q.	T.	C.	Q.	T.	C.	Q.
Dung 7 tons, Super 4 cwt., Nitrate of Soda 4 cwt.	11	4	0	8	11	2	8	7	0	9	15	2
Dung 7 tons, Super 4 cwt., Nitrate 2 cwt., Muriate of Potash 2 cwt.	10	10	0	9	8	2	8	1	3	9	6	0
Dung 7 tons, Phosphatic Peruvian Guano 3 cwt., Nitrate 2 cwt.	10	9	0	9	3	2	7	11	3	9	0	2
Dung 7 tons, Phosphatic Peruvian Guano 3 cwt., Nitrate 4 cwt.	10	19	2	9	14	0	7	18	3	9	9	0
Dung 7 tons, Phosphatic Peruvian Guano 3 cwt., Nitrate 2 cwt., Muriate of Potash 2 cwt.	11	3	0	9	15	0	7	8	3	9	6	0
Dung 7 tons, Super 4 cwt., Sulphate of Ammonia 1½ cwt.	10	13	3	10	11	3	8	7	1	9	10	2
Dung 7 tons, Super 4 cwt., Sulphate Ammonia 3 cwt.	10	8	1	10	10	0	8	4	0	9	6	0
Dung 7 tons, Super 4 cwt., Sulphate of Ammonia 1½ cwt., Muriate of Potash 2 cwt.	13	8	2	11	3	1	8	14	3	——		
Dung 14 tons	12	0	0	8	15	1	7	12	1	9	16	0
Dung 14 tons, Super 4 cwt., Nitrate 2 cwt.	11	14	2	8	14	0	7	16	2	9	15	2
Dung 14 tons, Super 4 cwt., Nitrate 4 cwt.	11	4	2	11	14	2	8	2	3	9	13	3
Dung 14 tons, Super 4 cwt., Nitrate 2 cwt., Muriate of Potash 2 cwt.	11	14	2	11	10	1	8	8	1	10	1	2
Dung 14 tons, Phosphatic Peruvian Guano 3 cwt., Nitrate 2 cwt.	11	14	0	10	1	2	6	18	2	9	6	1
Dung 14 tons, Phosphatic Peruvian Guano 3 cwt., Nitrate 4 cwt.	12	4	2	10	3	0	8	19	0	10	11	3
Dung 14 tons, Phosphatic Peruvian Guano 3 cwt., Nitrate 2 cwt., Muriate of Potash 2 cwt.	12	2	3	9	6	3	7	19	3	10	1	1
Dung 14 tons, Super 4 cwt., Sulphate of Ammonia 1½ cwt.	11	6	2	9	18	0	9	0	3	10	3	2
Dung 14 tons, Super 4 cwt., Sulphate of Ammonia 3 cwt.	12	11	3	10	9	1	8	12	3	10	11	3
Dung 14 tons, Super 4 cwt., Sulphate of Ammonia 1½ cwt., Muriate of Potash 2 cwt.	13	15	1	9	2	0	8	14	3	——		

Excess of Crop over yield of unmanured soil.

Manure per Acre.	1892.		1893.		1894.		Average of 1892 & 1894.	
	T.	C.	T.	C.	T.	C.	T.	C.
Dung 7 tons	3	5¼	1	6		18¾	2	2
Dung 7 tons, Super 4 cwt., Nitrate 2 cwt.	4	8¾		15¼	2	5½	3	7
Dung 7 tons, Super 4 cwt., Nitrate 4 cwt.	3	19¾		5½	3	4¾	3	12¼
Dung 7 tons, Super 4 cwt., Nitrate 2 cwt., Muriate of Potash 2 cwt.	3	5¾	1	2½	2	19½	3	2½
Dung 7 tons, Phosphatic Peruvian Guano 3 cwt., Nitrate 2 cwt.	3	4¾		17½	2	9½	2	17
Dung 7 tons, Phosphatic Peruvian Guano 3 cwt., Nitrate 4 cwt.	3	15¼	1	8	2	16½	3	6
Dung 7 tons, Phosphatic Peruvian Guano 3 cwt., Nitrate 2 cwt., Muriate of Potash 2 cwt.	3	18¾	1	9	2	6½	3	2½
Dung 7 tons, Super 4 cwt., Sulphate of Ammonia 1½ cwt.	3	9½	2	5¾	3	5	3	7¼
Dung 7 tons, Super 4 cwt., Sulphate of Ammonia 3 cwt.	3	4	2	4	3	1¾	3	3

Manure per Acre.	Excess of Crop over yield of unmanured soil. 1892. T.	C.	1893. T.	C.	1894. T.	C.	Average of 1892 & 1894. T.	C.
* Dung 7 tons, Super 4 cwt., Sulphate of Ammonia 1½ cwt., Muriate of Potash 2 cwt.	6	4½	2	17¼	3	12½	—	
Dung 14 tons	4	15¾		9¼	2	10	3	13
Dung 14 tons, Super 4 cwt., Nitrate 2 cwt.	4	10¼		8	2	14¼	3	12½
Dung 14 tons, Super 4 cwt., Nitrate 4 cwt.	4	0¼	3	8½	3	0½	3	10½
Dung 14 tons, Super 4 cwt., Nitrate 2 cwt., Muriate of Potash 2 cwt.	4	10¼	3	4¼	3	6	3	18
Dung 14 tons, Phosphatic Peruvian Guano 3 cwt., Nitrate 2 cwt.	4	9¾	1	15½	1	16¼	3	3
Dung 14 tons, Phosphatic Peruvian Guano 3 cwt., Nitrate 4 cwt.	5	0¼	1	17	3	16¾	4	8½
Dung 14 tons, Phosphatic Peruvian Guano 3 cwt., Nitrate 2 cwt., Muriate of Potash 2 cwt.	4	18½	1	0¾	2	17½	3	18
Dung 14 tons, Super 4 cwt., Sulphate of Ammonia 1½ cwt.	4	2¼	1	12	3	18½	4	0½
Dung 14 tons, Super 4 cwt., Sulphate of Ammonia 3 cwt.	5	7½	2	3¼	3	10½	4	9
* Dung 14 tons, Super 4 cwt., Sulphate of Ammonia 1½ cwt., Muriate of Potash 2 cwt.	6	11		16	3	9¼	—	

Before considering these results we may remind readers of our last report for 1892, that there was reason for doubting whether the high yields of the two plots marked * were really due, as would appear from the figures, to the use of muriate of potash, or to other circumstances. We then pointed out that these two plots were arranged in line, and that the course of an old ditch or drain had formerly run along the site of those plots, causing presumably a different condition of soil. As subsequent years yielded no corroboration of the otherwise highly favourable influence of potash salts for the Potato crop on this land, we conclude that the circumstance referred to and not the manuring was the cause of the increase, and therefore we think it right to eliminate those two particular 1892 plots from consideration.

In 1892 and 1893 the variety was "Magnum Bonum," in 1894 "Reading Giants." The previous crop of the soil in each year was as follows:—

	1892.	1893.	1894.
1889..	Oats		
1890..	Green Tares	Red Clover	Mangolds.
1891..	Cabbage followed by Potatoes..	Oats	Tares.
1892..		Oats followed by Potatoes....	Winter Oats.
1893..			Stubble Turnips followed by Potatoes.

In 1892 7 tons of dung produced an increase over unmanured land of 3 tons 5¼ cwt. As a chemical addition to this, excluding, as aforesaid, the plots marked *, the best results were obtained with a mixture of superphosphate and 2 cwt. of nitrate of soda, the increase being raised to 4 tons 8¾ cwt. The cost of the artificials was only about 32s., and the gain 1 ton 3 cwt. of potatoes at 50s. a ton, so that even at this low price for potatoes, a very good profit was yielded. More nitrate appeared to do no good, and sulphate of ammonia was distinctly inferior to nitrate of soda.

14 tons of dung instead of 7 gave an increase over the unmanured land of 4 tons 15¾ cwt., or about 1¼ ton more than the 7 tons of dung. The use of chemicals, again excluding the plot marked *, although it slightly increased this yield, did not do so remuneratively.

In 1893, the year, as it is scarcely necessary to remind the reader, of extraordinary drought, it will be seen that while 7 tons of dung raised the produce by 1 ton 6 cwt. over the unmanured land, 14 tons only raised it 9¼ cwt. The result, therefore, on this series of experiments must be regarded as altogether useless for general deduction. It may be noticed, however, that, as a matter of fact, on the lightly dunged plots better results were yielded on the sulphate of ammonia plots than on the nitrate plots. On the heavily dunged plots however, superphosphate and nitrate of soda gave results very markedly superior to superphosphate and sulphate of ammonia.

In 1894 7 tons of dung gave an increase over unmanured land of less than a ton per acre. This increase was raised to 3 tons 4¾ cwt. by superphosphate and 4 cwt. of nitrate of soda, that is to say, about 2¼ tons of Potatoes were yielded in return for an expenditure on artificials of about 52s. It is hardly necessary to say that this result was highly remunerative.

Superphosphate and 2 cwt. of nitrate of soda only raised the increase to 2 tons 5½ cwt., giving 1 ton of Potatoes less than the heavy dressing. This result was also decidedly remunerative, but less so than that of the heavier dressing of nitrate. Phosphatic Peruvian guano did not do better than superphosphate.

Superphosphate and 1½ cwt. of sulphate of ammonia raised the increase to 3 tons 5 cwt., or about the same as the heavy dressing of nitrate of soda, and in this case gave a more remunerative result, but an increased quantity of sulphate of ammonia did no more good.

Potash slightly improved the yield, both on the nitrate and sulphate of ammonia plots, but only slightly.

On the more heavily dunged plots 14 tons of dung alone gave an increase over the unmanured yield of 2 tons 10 cwt., or 1½ tons more than the lighter dressing, viz., 7 tons of dung. Superphosphate and 2 cwt. of nitrate of soda, together with 2 cwt. of muriate of potash, raised the increase to 3 tons 6 cwt., or 16 cwt. more than dung alone, the increased crop, however, giving only a small profit on the artificials.

3 cwt. of phosphatic Peruvian guano and 4 cwt. of nitrate raised the yield to 3 tons 16¾ cwt., or about 1 ton 7 cwt. more than 14 tons of dung alone, a sufficiently large yield to leave a profit on the use of artificials.

The largest yield was obtained by superphosphate and 1½ cwt. of sulphate of ammonia, which raised the increase to 3 tons 18½ cwt., or 1 ton 8 cwt. more than the 14 tons dung alone. This was the best crop, and showed a good profit.

If the results of the years 1892 and 1894 be averaged, we find that—

	Tons.	Cwt.
(a) 7 tons of dung produced a mean increase of...	2	2
(b) The addition of Superphosphate and 4 cwt. of nitrate raised the mean increase to...	3	12¼
(c) The addition of Superphosphate and 2 cwt. of nitrate raised the mean increase to...	3	7
(d) The addition of Superphosphate and 1½ cwt. of sulphate of ammonia raised the mean increase to	3	7¼
(e) The addition of Phosphàtic Peruvian guano and 4 cwt. of nitrate raised the mean increase to	3	7¼

In these two years, therefore, the most economical artificial addition to 7 tons of dung was a dressing of superphosphate, accompanied by either 2 cwt. of nitrate of soda or 1½ cwt. of sulphate of ammonia.

As there is at present practically no difference between the cost of 2 cwt. of nitrate of soda and 1½ cwt. of sulphate of ammonia, it is difficult from these results to decide more in favour of one or the other. In either case a mean extra yield of a ton and a quarter of potatoes, worth say 65s., was obtained for an expenditure of about 32s. in superphosphate and nitrate or sulphate as the case may be.

14 tons of dung raised the mean increase to 3 tons 13 cwt. This yield was not, on the mean of the two years, remuneratively increased by the addition of artificials. It is true that a still further mean increase of 15 cwt. was obtained by the heavy use of nitrate of soda and guano, and of 16 cwt. by the heavy use of sulphate of ammonia with superphosphate, but this was produced in either case at a loss.

On the whole, then, we find in these two years that with a dressing of 7 tons of dung per acre the average yield was raised by an expenditure of 32s. in artificials to the extent of 1¼ tons of Potatoes, worth, say at 52s. a ton, 65s., a profit of 33s an acre. When the artificial dressing was replaced by an additional 7 tons of dung, which, valued at 5s. a ton, cost 35s., the increase gained by such addition was on the average 1 ton 11 cwt. of Potatoes, worth, at 52s. a ton, 80s. 6d., a profit of 45s. 6d., so that on the average of these two years the heavy dunging paid better than light dunging and artificials.

It will be noticed that the calculations as to profit or loss are based on the price actually obtained for the crop, viz., 52s. per ton. *Had the potatoes been marketed at the later high price of* 90s., *per ton the profits on the manuring would obviously have been much greater.*

The dung used was cow-dung, which is worth noting in view of a somewhat prevalent idea among farmers that cow-dung is not possessed of much value.

CABBAGES (at Melbourne, Chelmsford) (Mr. Rosling).

The Cabbage Experiments were on exactly the same lines as those of 1892, already reported.

The field was part of the field used for Potatoes, and had been cropped in 1890 with Mangolds, in 1891 with Oats, in 1892 with Tares, and in 1893 with Winter Oats.

In 1892 the crop was somewhat handicapped, owing to the fact that the fly devoured the first plant, necessitating re-sowing, and, therefore, a rather late start.

In 1894 everything went well. The cabbage used was Sutton's "Late Drumhead." The seed was drilled on May 11, on the ridge system, the dung and superphosphate or guano, muriate of potash or salt, being enclosed in the balk under the seed, in accordance with the usual mode in which roots are grown in this part of the country.

On the nitrate plots 1 cwt. of nitrate of soda was also applied in the same way. The remaining quantity of nitrate of soda was sown in successive top dressings of 1 cwt. each, in the earlier part of July, of August, and of September, the total dressing of 4 cwt. being thus distributed over more than four months.

The superphosphate cost £3 per ton, and contained 26·42 per cent. of soluble phosphate; the Peruvian guano was of the phosphatic kind, containing 46·13 per cent. of phosphate of lime and 3·07 per cent. of ammonia, and cost £6..12..6 per ton; the nitrate of soda contained 95 per cent. of pure nitrate of soda, and cost £10..10 per ton; the muriate of potash cost £9..5 per ton, and the salt £2 per ton.

The following are the results of the experiments:—

Manure per Acre.	Weight of Cabbages per Acre.	
	T.	C.
No Manure	15	9
Ditto (duplicate plot)	13	17
Mean of these Two Plots	14	13
Dung 14 tons	20	0¾
Ditto (duplicate plot)	16	9¾
Mean of these Two Plots	18	5¼
Dung 14 tons, Superphosphate 4 cwt.	20	14¼
Dung 14 tons, Super 4 cwt., Nitrate of Soda 4 cwt.	28	16
Dung 14 tons, Super 4 cwt., Nitrate 4 cwt., Salt 3 cwt.	31	14
Dung 14 tons, Super 4 cwt., Nitrate 4 cwt., Muriate of Potash 3 cwt.	32	11½
Dung 14 tons, Guano 3 cwt.	21	15½
Dung 14 tons, Guano 3 cwt., Nitrate of Soda 4 cwt.	32	12
Dung 14 tons, Guano 3 cwt., Nitrate 4 cwt., Muriate of Potash 3 cwt.	32	8¾
No Dung, Super 4 cwt., Nitrate 4 cwt., Salt 3 cwt.	21	6½
No Dung, Super 4 cwt., Nitrate 4 cwt., Muriate of Potash 3 cwt.	18	5¾
No Dung, Guano 3 cwt., Nitrate 4 cwt., Salt 3 cwt.	22	4
No Dung, Guano 3 cwt., Nitrate 4 cwt., Muriate of Potash 3 cwt.	20	19¾

In the following table we give the increase of Cabbages per acre over the yield of unmanured land, due to manuring, the cost of the manures, and the value of the increase in produce. Dung is valued at 5s. a ton, and cabbages at 10s.:—

DUNGED PLOTS.

Dunged Plots.	Increase of Cabbages over unmanured land. T.	C.	Cost of Manures. £	s.	d.	Value of Increase in Cabbages at 10s. per ton. £	s.	d.
Dung only, 14 tons (mean)	3	12¼	3	10	0	1	16	0
Dung 14 tons, Super 4 cwt	6	1¼	4	2	0	3	0	6
Dung 14 tons, Super 4 cwt., Nitrate 4 cwt.	14	3	6	4	0	7	1	6
Dung 14 tons, Super 4 cwt., Nitrate 4 cwt., Salt 3 cwt.	17	1	6	10	0	8	10	6
Dung 14 tons, Super 4 cwt., Nitrate 4 cwt., Muriate of Potash 3 cwt.	17	18½	7	12	6	8	19	3
Dung 14 tons, Guano 3 cwt.	7	2½	4	9	10	3	11	3
Dung 14 tons, Guano 3 cwt., Nitrate 4 cwt.	17	19	6	11	10	8	19	6
Dung 14 tons, Guano 3 cwt., Nitrate 4 cwt., Muriate of Potash 3 cwt.	17	15¾	8	0	4	8	18	0
UNDUNGED PLOTS.								
Super 4 cwt., Nitrate 4 cwt., Salt 3 cwt.	6	13½	3	0	0	3	6	9
Super 4 cwt., Nitrate 4 cwt., Muriate of Potash 3 cwt.	3	12¾	4	2	6	1	16	6
Guano 3 cwt., Nitrate 4 cwt., Salt 3 cwt.	7	11	3	7	10	3	15	6
Guano 3 cwt., Nitrate 4 cwt., Muriate of Potash 3 cwt.	6	6¾	4	10	4	3	3	6

In the following table is shown the increase produced by the use of artificials over and above that produced by the dung, together with its value and cost of production:—

Manure In addition to 14 tons dung.	Increase of Cabbages due to Artificials over and above Dung. T.	C.	Cost of Artificals. £	s.	d.	Value of increase of Cabbages per acre due to Artificials. £	s.	d.
Super 4 cwt.	2	9	0	12	0	1	4	6
Super 4 cwt., Nitrate 4 cwt.	10	10¾	2	14	0	5	5	6
Super 4 cwt., Nitrate 4 cwt., Salt 3 cwt.	13	8¾	3	0	0	6	14	6
Super 4 cwt., Nitrate 4 cwt., Muriate of Potash 3 cwt.	14	6¼	4	2	6	7	3	0
Guano 3 cwt.	3	10¼	0	19	10	1	15	0
Guano 3 cwt., Nitrate 4 cwt.	14	6¾	3	1	10	7	3	6
Guano 3 cwt., Nitrate 4 cwt, Muriate of Potash 3 cwt.	14	3½	4	10	4	7	1	9

The main feature of the experiments is to indicate, in accordance with our previous experience, that dung *alone*, up to 14 tons an acre, is not a profitable application for Cabbages, but that it should be *liberally supplemented with nitrate of soda and other artificials.*

In previous experiments with Cabbages we have found that the use of artificials without dung yielded highly profitable results, but this was not so last year. This experience shows that, as we have found in the case of Mangolds, it is not wise, in growing Cabbages, to *dispense* with the use of dung. Probably much of its value is mechanical rather than feeding, and artificials should not be relied upon to displace it, but rather to supplement it.

A review of the foregoing tables shows that the heaviest crop was produced by the addition to 14 tons of dung of 3 cwt. of phosphatic Peruvian guano and 4 cwt. of nitrate of soda per acre, which yielded an increase of 18 tons of Cabbages per acre, at a total cost, including dung, of £6..11..10. The 18 tons of Cabbages therefore cost less than 7s. 6d. per ton.

The next best result was an increase of 17 tons per acre, grown by the use, in addition to 14 tons of dung, of 4 cwt. of superphosphate, 4 cwt. of nitrate of soda, and 3 cwt. of salt, at a cost, including dung, of £6..10 per acre. The 17 tons increase therefore cost slightly over 7s. 6d. per ton.

Seeing that Cabbages may be fairly valued at at least 10s. a ton consuming value, these results are highly satisfactory.

Potash in one case seemed to do a little good, but not in others, so that its use on such soil as the moderately heavy land at Melbourne for Cabbages presents no advantage over that possessed by salt, the value of which seems to be shown this year, although it was not shown in each of the previous experiments.

Experiments elsewhere have shown salt to be a valuable manure for Cabbages, and as it is very cheap we should think that its use generally for this crop should not be neglected unless it is shown by experiment to do no good.

The actual profit due to the use of the various artificials can be gathered by readers from the table in which we have shown the increase obtained by the aid of artificials over and above that yielded by dung alone, together with the cost of the artificials and the value of the Cabbages, reckoned at 10s. a ton.

Recommendation as to Cabbage Manuring.

On the whole, we should venture to recommend for the growth of Cabbages a good dressing of dung, say 14 tons an acre, supplemented by either 3 cwt. of phosphatic Peruvian guano or 4 cwt. of supherphosphate, together with 3 cwt. of salt and 4 cwt. of nitrate of soda. 1 cwt. of nitrate of soda should be sown with the guano or superphosphate before the seed is drilled, a second cwt. at singling out time, and the remaining 2 cwt. subsequently at intervals of a few weeks. The salt may be sown with the first top dressing.

If there is reluctance to undertake the trouble of so many dressings, it may be regarded as permissible, on a reasonably heavy soil, to sow 2 cwt. of the nitrate at seed time, and to sow the other 2 cwt. together a few weeks after singling out ; but on light land it seems to be very desirable that our plan of spreading the application of the nitrate over several dressings should be adhered to, as otherwise some of the nitrate may be washed down into the subsoil before the plants get the benefit of it.

We should recommend phosphatic Peruvian guano in preference to superphosphate on soils that are poor in carbonate of lime.

Probably no crop responds so freely and so heavily to the action of nitrate of soda as the Cabbage crop, and as it is one of especial value to those who keep a large head of dairy cattle, we hope that our repeated demonstrations of the great weight that can be grown at small cost and trouble by proper manuring will lead to its increased and more profitable cultivation.

BARLEY EXPERIMENTS (manuring) at Little Boyton Hall, Roxwell (Mr. Christy).

These experiments were on much the same lines as those carried on in 1892 and projected for 1893. In the 1892 experiments on the same farm a very fair crop was grown, running up on the best plot to 52 bushels per acre. The field selected last year was lighter than that used in 1892, the proportion of clay in it being less. On this field, for some unexplained reason, the Barley crop last year was very light, the whole of the field in which the experimental area was included yielding less than 3 quarters per acre of very poor Barley, and the comparative yields of the different plots showed no concordance, the variations being obviously dependent on some influence other than manure. As a publication of the figures would only be calculated to mislead any one attempting to draw any inference bearing on the object for which the experiments were undertaken, they are not here recorded.

WHEAT (variety experiments) at Melbourne (Mr. Rosling), and Roxwell (Mr. Christy).

All crops were grown under the same conditions of manuring, and manured with phosphatic manure and 1 cwt. of nitrate of soda, the Plots being one acre each. The following are the yields, stated in bushels of 63lbs.; in the case of the Melbourne experiments the weight of the Straw also was recorded.

	ROXWELL. Bushels of Wheat per Acre.	MELBOURNE. Bushels of Wheat per Acre.	Weight of Straw per Acre. T.	C.	Q
I. Rivetts	49·04	58·41	2	11	0
II. King's Unrivalled White (W)	31·66	49·31	2	8	1
III. Hallett's Original Red (R)	30·96	42·53	2	5	2
IV. Rough Chaff (W)	41·03	55·00	2	12	2
V. Browick (R)	49·63	58·38	2	13	2
VI. Golden Drop (R)	37·22	52·36	2	13	2
VII. Square Head (R)	——	52·21	2	10	2
VIII. Carter's Hundred Fold (R)	39·33	52·15	2	8	2
IX. Carter's Stand-up (W)	38·39	58·57	2	9	1
X. Scholey's Square Head (R)	36·95	57·30	2	8	2
XI. Mixed III., V., VI., VII., VIII., IX., X	37·65	56·60	2	12	0
XII. Square Heads Master	43·38	55·30	2	11	1

In the following table the varieties are entered in order, in accordance with their yield, the varieties giving closely the same yield being bracketed together. As these results speak for themselves, it is unnecessary to comment on them.

ROXWELL.

		Bushels.
Browick	(R)	49·63
Rivetts		49·04
Square Heads Master	(R)	43·38
Rough Chaff	(W)	41·03
Carter's Hundred Fold	(R)	39·33
Carter's Stand-Up	(W)	38·39
Golden Drop	(R)	37·22
Scholey's Square Head	(R)	36·95
King's Unrivalled White	(W)	31·66
Hallett's Original Red	(R)	30·96

MELBOURNE.

		Bushels.
Carter's Stand-Up	(W)	58·57
Rivetts		58·41
Browick	(R)	58·38
Scholey's Square Head	(R)	57·30
Square Heads Master	(R)	55·30
Rough Chaff	(W)	55·00
Golden Drop	(R)	52·36
Square Head	(R)	52·21
Carter's Hundred Fold	(R)	52·15
King's Unrivalled White	(W)	49·31
Hallett's Original Red	(R)	42·53

OATS (variety experiments) at Melbourne (Mr. Rosling).

The following trials were made of five varieties of Oats, the Plots, as in the case of the Wheat experiments, being one acre each. The results are stated in bushels of 40lbs, the "natural" or actual weight of the produce being also given.

	Bushels per Acre.	Natural weight per Bushel. lbs.
White Canadian	62·0	42½
Black Tartarian	58·7	41
Webb's Challenge White Canadian	58·5	43
New Zealand	56·6	43
Carter's Prize Cluster	56·3	44

APPENDIX.

Soil Analysis, 1894.

	Melbourne Cabbage and Potato Field.
Siliceous matter	83·66
Oxide of Iron and Alumina	8·08
Lime	·99
Magnesia	·40
*Potash	·39
Soda	·11
*Phosphoric Acid	·13
Organic matter and undetermined constituents	6·24
	100·00

*Including soluble in 1 per cent. solution of Citric Acid:—

Potash	·014
Phosphoric Acid	·020

RAINFALL in 1893-4.

REGISTERED AT MELBOURNE, CHELMSFORD.

	1893.	1894.
January	1·35	2·11
February	2·46	1·26
March	·33	·66
April	·10	1·75
May	1·09	1·33
June	·52	1·78
July	1·93	2·74
August	1·37	1·93
September	1·14	1·57
October	2·86	2·75
November	2·18	2·88
December	1·68	1·53
	17·01	22·29

Mr. Amis Hempson (the Chairman of the Society's Experiments Committee) has been good enough also to furnish us with the Rainfall registered in his gauge in another part of the County, viz., at Ramsey, near Harwich, which is appended for comparison.

REGISTERED AT RAMSEY, NEAR HARWICH.

	1893.	1894.
January	2·23	1·99
February	2·93	1·34
March	·35	·71
April	·08	2·29
May	1·11	2·27
June	·73	2·09
July	2·43	3·69
August	1·41	3·08
September	1·50	1·17
October	2·31	2·98
November	2·97	3·11
December	1·28	1·71
	19·33	26·43

BERNARD DYER,
EDWARD ROSLING.

April, 1895.